



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,260	07/16/2003	Rong Xiao	MS1-1528US	9728
22801	7590	11/02/2007		
LEE & HAYES PLLC 421 W RIVERSIDE AVENUE SUITE 500 SPOKANE, WA 99201			EXAMINER YUAN, KATHLEEN S	
			ART UNIT 2624	PAPER NUMBER
			MAIL DATE 11/02/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/621,260	Applicant(s) XIAO ET AL.	
	Examiner Kathleen S. Yuan	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-68 is/are pending in the application.
- 4a) Of the above claim(s) 2,3,9-25,32-40,42,46-50,52-54,56,60-66,68 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,4-8,26-31,41,43-45,51,55,57-59 and 67 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>7/16/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. The applicant has elected Group II and these claims are examined below. The applicant further traverses the restriction because the groups contain the same claim; therefore, the invention cannot be distinct. In the previous restriction, the examiner has provided ways in which the claims are distinct, as seen by separate classification areas. The reason claims 1 and 41 were included in each group is because the extreme breadth of these claims make it possible for them to be read on any and all of the groups (similar to a generic claim). The claims have little identity of their own and ultimately take their identity and meaning from the claim that depends upon them. If one of these claims are found to be allowable without needing the details of the specific claims, the withdrawn claims will be rejoined. Therefore, this restriction is made final.

Claim Objections

2. Claim 8 is objected to because of the following informalities: Claim 8 has variables a_1 , b_1 , a_2 and b_2 , and later defines them as " a_i " and " b_i ". " i " is not clearly defined. It would be appropriate to simply add "wherein $i=1$ or 2 " in order to clarify that the variables are directly related, or to simply list as a_1 , b_1 , a_2 and b_2 in place of a_i and b_i . Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

Art Unit: 2624

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 8 and 30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

5. Claim 8 refers to $f_1(x)$ and $f_2(x)$. It is not clear where in the specification the applicant has defined these functions of x . The applicant is invited to point to an area of the specification that enables these functions in the pre-filter stage, and the rejection will be withdrawn.

6. Claim 30 refers to "mirror invariant features [that] are threshold configured." It is not clear where in the specification the applicant has defined that the mirror invariant features are threshold configured. The applicant is invited to point to an area of the specification that enables this language, and the rejection will be withdrawn.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 4, 5 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

9. Claim 4 recites the limitation "said plurality of portions" in line 2. There is insufficient antecedent basis for this limitation in the claim.

10. Claim 8 recites the limitation " $f_1(x)$ " and " $f_2(x)$ " in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

11. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12. Claims 1, 41 and 55 are rejected under 35 U.S.C. 102(b) as being unpatentable by "Robust Real-time Object Detection" (Viola et al).

13. Regarding claim 1, Viola et al discloses a method for use in detecting faces within a digital image (page 1, paragraph 2, lines 2-3), the method comprising: processing a set of initial candidate portions that are "integral images", of digital image data, in a boosting filter stage that uses a boosting chain carried out by AdaBoost to produce a set of intermediate candidate portions (page 2, paragraph 4); and processing said set of intermediate candidate portions in a post-filter stage to produce a set of final candidate portions, "promising regions" (page 2, paragraph 5).

14. Regarding claim 41, Viola et al discloses a computer-readable medium having computer-implementable instructions for causing at least one processing unit to perform acts comprising: detecting possible human face image data within a digital image (page

Art Unit: 2624

1, paragraph 2, lines 2-3) using a multiple stage face detection scheme (page 2) that includes at least a boosting filter stage configured to process a set of initial candidate portions of digital image data using a boosting chain carried out by AdaBoost to produce a set of intermediate candidate portions (page 2, paragraph 4), and a post-filter stage configured to process said set of intermediate candidate portions to produce a set of final candidate portions, "promising regions" (page 2, paragraph 5).

15. Regarding claim 51, Viola et al discloses an apparatus comprising logic operatively configured to detect at least one human face within a digital image (page 1, paragraph 2, lines 2-3) using a multiple stage face detection process (page 2) that includes at least a boosting filter stage configured to process a set of initial candidate portions of digital image data using a boosting chain carried out by AdaBoost to produce a set of intermediate candidate portions (page 2, paragraph 4), and a post-filter stage configured to process said set of intermediate candidate portions to produce a set of final candidate portions, wherein at least one of said final candidate portions includes detected face image data, "promising regions" (page 2, paragraph 5).

16. Regarding claim 4, Viola et al discloses processing said plurality of portions using a pre-filter stage that is configured to output said set of initial candidate portions selected from said plurality of portions based on at least one feature, a Haar- like feature (page 2, paragraph 3)

17. Claims 43 and 57 are rejected for the same reasons as claim 4. Thus, the arguments analogous to that presented above for claim 4 are equally applicable to claims 43 and 57. Claims 43 and 57 distinguishes from claim 4 only in that they have

Art Unit: 2624

different dependencies, all of which have been previously rejected. Therefore, prior art applies.

18. Regarding claim 5, Viola et al discloses that the feature is a Haar-like feature (page 2, paragraph 3, lines 3-4).

19. Claims 44 and 58 are rejected for the same reasons as claim 5. Thus, the arguments analogous to that presented above for claim 5 are equally applicable to claims 44 and 58. Claims 44 and 58 distinguishes from claim 5 only in that they have different dependencies, all of which have been previously rejected. Therefore, prior art applies.

20. Regarding claim 26, Viola et al employs a feature-based algorithm in a prefilter stage, as explained above in the rejection for claim 4 and shown on page 2, paragraph 3. Furthermore, the entire process uses many feature-based algorithms (page 3, paragraph 5).

21. Regarding claim 51, Viola et al employs a feature-based algorithm in a prefilter stage (page 2, paragraph 3) and the feature includes a Haar-like feature (page 2, paragraph 3, lines 3-4).

22. Claim 67 is rejected for the same reasons as claim 51. Thus, the arguments analogous to that presented above for claim 51 are equally applicable to claim 67. Claim 67 distinguishes from claim 51 only in that they have different dependencies, both of which have been previously rejected. Therefore, prior art applies.

23. Regarding claim 27, Viola et al discloses that at least one feature based algorithm uses Haar-like features (page 4, paragraph 2).

24. Regarding claim 28, Viola et al discloses that at least one feature-based algorithm uses extended features (fig. 1, D, which corresponds to fig. 12c of the applicant's specification which is extended features).

25. Regarding claim 29, Viola et al discloses at least one feature-based algorithm uses mirror invariant features (fig. 1, c, which corresponds to fig. 12e of the applicant's specification of mirror invariant features).

26. Regarding claim 30, Viola et al discloses that mirror invariant features are threshold configured when showing that mirror invariant features are used (fig. 1c) and later a threshold is used on classifiers (page 8, paragraph 1-4) based on features (page 7, paragraph 5).

27. Regarding claim 31, Viola et al discloses at least one feature-based algorithm uses variance features (fig. 1, A, which corresponds to fig. 12h of the applicant's specification of variance features.)

28. Regarding claim 6, by reinterpreting the pre-filter stage as being the first part "the integral image" (page 2, paragraph 3) and also part of the AdaBoost procedure as well from page 2, paragraph 4 and figure 6, items 1 and 2. The boosting chain step will be interpreted as the rest of the AdaBoost procedure that is not part of the pre-filter stage (fig. 6, item 3), and the post filtering stage is the "further processing" of fig. 6.

Therefore, Viola et al discloses that the pre-filter stage includes a linear filter, since items 1 and 2 are filtering out rejections and are arranged in a linear fashion.

29. Regarding claim 7, the filter is based on a weak learner (page 12, paragraph 1).

30. Claims 45 and 59 are rejected for the same reasons as the combination of claims 6 and 7. Thus, the arguments analogous to that presented above for claims 6 and 7 are equally applicable to claims 45 and 59. Claims 45 and 59 distinguishes from claims 6 and 7 only in that they have different dependencies, all of which have been previously rejected, and that claims 45 and 59 are each a combination of claims 6 and 7 together. Since all limitations are addressed in the rejections for claims 6 and 7, prior art applies.

31. Regarding claim 8, Viola teaches that the linear filter is based on the decision function of $H(x) = (a_1 f_1(x) > b_1) \wedge (a_2(f_1(x) + r f_2(x)) > b_2)$ in the equation shown in table 1, where $H(x) = h(x)$; $a_1 = \alpha_1$, $f_1(x) = h_1(x)$ and $b_1 = 1/2 \alpha_1$ when $T=1$; and $a_2 = \alpha_1$, $f_1(x) = h_1(x)$, $r = \alpha_2 / \alpha_1$, $f_2(x) = h_2(x)$ and $b_2 = 1/2 (\alpha_1 + \alpha_2)$ when $T=2$.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen S. Yuan whose telephone number is (571)272-2902. The examiner can normally be reached on Monday to Thursdays, 9 AM to 5 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (571)272-7695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KY

4/28/2007



BHAVESH M MEHTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600